

Calorie restriction causes temporal changes in liver metabolism

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Moderate calorie restriction causes temporal changes in the liver and skeletal muscle metabolism, whereas moderate weight loss affects muscle, according to a new study in *Gastroenterology*, the official journal of the American Gastroenterological Association (AGA) Institute. In addition, researchers found that short-term calorie restriction (CR) with a low-carbohydrate diet caused a greater change in liver fat content and metabolic function than short-term CR with a high-carbohydrate diet.

Insulin resistance is the most common metabolic complication associated with obesity and is associated with an increased risk of developing non-alcoholic fatty liver disease (NAFLD) and type 2 diabetes. Although an energy-deficit [diet](#) is the cornerstone of therapy for obesity, the most appropriate macronutrient composition of diet therapy needed to improve metabolic health remains controversial.

"Our data underscore the complexity of the metabolic effects of calorie restriction with diets that differ in macronutrient composition, and demonstrate differences among organ systems in the response to [calorie restriction](#) and subsequent [weight loss](#)," said Samuel Klein, MD, of the Washington University School of Medicine and lead author of the study. "Our findings help explain the rapid improvement in glucose levels observed after low-calorie diet therapy and bariatric surgery," he added.

In the present study, 22 obese patients were randomized to a high-carbohydrate or low-carbohydrate energy-deficit diet. A euglycemic-hyperinsulinemic clamp, muscle biopsies and [magnetic resonance](#)

[spectroscopy](#) were used to determine [insulin](#) action, cellular insulin signaling and intrahepatic triglyceride (IHTG) content before, after 48 hours and after ~11 wks (7 percent weight loss) of diet therapy. An euglycemic-hyperinsulinemic clamp is a widely used experimental procedure for the determination of insulin sensitivity.

Researchers found that short-term CR caused a rapid decrease in IHTG content, an increase in hepatic insulin sensitivity and a decrease in endogenous glucose production rate, whereas longer-term CR and a moderate 7 percent weight loss improved skeletal muscle [insulin sensitivity](#) in conjunction with an increase in cellular insulin signaling. The effect of moderate CR in obese patients with either a low-fat or low-carbohydrate diet on metabolic function is a continuum, with differential effects on specific organ systems.

Source: American Gastroenterological Association ([news](#) : [web](#))

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